DOCUMENT RESUME

ED 231 527 PS 013 731

AUTHOR Cossette-Ricard, Marcelle; Gouin Decarie, Therese
TITLE Object Identity in Infants.
PUB DATE Apr 83
NOTE 15p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (50th, Detroit, MI, April 21-24, 1983).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Age Differences; *Cognitive Development; *Cognitive Processes; *Concept Formation; Criteria; Foreign Countries; *Infants; *Object Permanence
IDENTIFIERS Canada; *Rule Application

ABSTRACT

A series of studies focused on (1) the evolution of the notion of identity of objects among infants up to 15 months of age and (2) the changing rules by which this development may be understood. Six identity tasks were presented to 60 infants divided into five age groups: 5, 7, 9, 12, and 15 months. Two objects were used in all tasks. In the first three tasks, the experimenter "transformed" one object by reorienting, rotating, or removing it. In the remaining three tasks, one object was replaced by a substitute object whose features could be either similar to or different from the object replaced; the last two tasks in this group involved the disappearance of a moving object. Since subjects had to recognize objects despite spatio-temporal changes, each of the six tasks posed a specific object identity problem to the infant. Facing such problems, infants used different strategies at different ages. Combined comparative analyses of all responses revealed main trends in the development of the concept of object identity in the sensorimotor infant. Results indicated that the evolution of the identity concept between 5 and 15 months can be understood in terms of increasingly more complete criteria which allow the infant to understand that objects remain themselves despite changes they undergo. (In conclusion, theoretical implications of the findings are discussed.) (RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED231527

Marcelle COSSETTE-RICARD
Thérèse GOUIN DECARIE
Département de psychologie
Université de Montréal.

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

OBJECT IDENTITY IN INFANTS

Paper presented at the
Society for Research in Child Development
Detroit (Mich.)
April, 1983

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Marcelle Cossette-Ricard
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PS 013731

Bower (1975) has written: "I would hazard a guess that the object concept is the most studied problem in infancy, bar smiling, perhaps." In fact, it is not the object concept that has been studied up to now (see Haith and Campos 1977), but one of its aspects: object permanence (or object constancy). The Piagetian object concept is much more than permanence (see Décarie 1978), and in recent years, researchers such as Bower, Wishart, Moore and their collaborators (1) have attempted to isolate another crucial property of things: their identity. It is within this context that our research lies (Cossette-Ricard 1980, 1983): it focuses on the evolution of the notion of identity during the first 15 months and on the changing rules by which this development may be understood.

(1) Bower 1974; Bower, Broughton and Moore 1971; Bower and Paterson 1973; Moore 1974, 1975; Moore, Borton and Darby 1978; Moore and Clark 1975; Moore and Meltzoff 1978; Moore and Myers 1975; Wishart 1979.

First, we must distinguish what Gibson (1975) calls: discrimination and recognition. It is one thing to be able to differentiate one object from another. It is quite another thing to be able to recognize an object despite the different changes it might undergo. A stable universe becomes possible only when persons and things remain the same despite the changes that affect them. To master object identity, an infant must therefore understand that a given object, following certain transformations, does not become another object.

Piaget (1968; Piaget and Voyat 1968) has studied identity but mostly at the pre-operational level: he found that the child between three and eight years of age, gradually comes to accept that a plant can grow and thus change its shape completely without turning into another plant, or that a given quantity of liquid remains the same despite the different shaped containers into which it is poured. Our study dealt with much simpler "transformations" which do not affect the "shape" of an object but affect its posture, its place, its movements, in other words, its position in time and space.

Let us take as an example a little doll. This doll, like most of the objects among which an infant lives, is not unchanging, even though its shape remains the same. It is not rigidly fixed in the child's spatio-temporal environment. It can be turned upside down, front to back, it can be partially or completely covered by another object, it can also be changed from its stationary to a moving state, thereby altering its position. All sorts of spatio-temporal events can happen to this doll. Now, one of the first cognitive skills of an infant will be to understand that the doll which is turned, hidden or displaced does not

become a new doll but remains the same one. In other words, the doll has conserved its own identity despite these various modifications. Even though it seems quite obvious to the mind of an adult, it takes an infant a full fifteen months to develop this competence. Our research has attempted to determine the principal stages in this development.

Directly inspired by, and for some of them borrowed from, the works of Bower and Moore (mainly Bower, Broughton and Moore 1971; Moore and Myers 1975; Moore, Borton and Darby 1978), our experiments consisted of a series of six identity tasks that were presented to 60 infants divided into five age groups (5, 7, 9, 12 and 15 months). Two objects were used in all of these tasks, but in the case of the first three tasks, two similar objects were presented to the subject. As soon as s/he attempted to grasp one of the objects, the experimenter "transformed" it, leaving the other object intact. The transformations were the following:

Task 1, Reorientation (turning the object upside down);

Task 2, Rotation (turning the object front to back);

Task 3, Disappearance (hiding the object behind a screen).

In the other three tasks, the target object was replaced by a substitute object whose features could be either similar or different from those of the target object. In task 4, Substitution, two very different objects were presented to the infant and as soon as s/he reached towards one, both objects were hidden behind a large screen; E could then, without the baby knowing, invert their positions. In the last two tasks which implied disappearance of a moving object, a wooden track with two cardboard screens was used. In task 5, first a car disappeared

behind screen I, reappeared only to disappear again behind screen II and then, respecting the timespan which this car would take to move in the space behind this screen, a fire engine reappeared at its exit. In task 6, a car disappeared behind screen I; a similar car appeared at the exit of screen II, but without any mobile crossing the space between the two screens.

Each of these six tasks posed a specific identity problem to the infant, since s/he had to recognize her/his target object (the object towards which s/he was reaching at the beginning) despite the spatio-temporal changes it underwent. To face these problems, the infants used different strategies at different ages. In the first three tasks, for example, four main responses have been observed. The infant could a) keep on reaching and grasp the transformed object; b) change direction and grasp the untransformed (similar) object; c) grasp both objects; or d) reproduce the transformation, either by transforming the untransformed object or by "de-transforming" the transformed object. In task 4, the infant could, according to her/his developmental level, a) grasp the substitute object standing in the position towards which s/he was first reaching; or b) find her/his target object in its new position. In the same manner, the infant, depending on her/his age, will simply, in tasks 5 and 6, a) keep on tracking the second mobile, or b) show some surprise seeing the second mobile, or c) be less interested in the second mobile than in searching for the first one.

By observing all of the infants' responses to these different tasks, we were able to analyse the strategies they used. We were not expecting the children to "succeed" in these tasks; in other words, we did

not look for "correct" responses in each task. That would mean asking the infants to act like adults do. We preferred, following Vurpillot (1976), to consider every response, no matter what it was, including "errors" in adult terms, as "appropriate". The children's responses, including their errors, represent their own way, depending on their age and cognitive level, to solve the tasks. Thus, all six tasks were presented to the babies of all five age groups and it is the combined comparative analysis of their responses that has brought to light the meaning of each response and the main trends in the development of the concept of object identity in the sensori-motor infant. These results are summarized in the following chart:

Insert chart here

This chart shows, as already postulated by Bower, Wishart and Moore, that the evolution of the identity concept between five and fifteen months can be understood in terms of "identity rules", that is, in terms of increasingly more complete criteria which allow the infant to understand that objects remain themselves despite changes that they undergo.

First the youngest infants (five months) utilize a set of rules which are exclusively spatial, and they use them only in the case of visible objects. To establish the object's identity, they take into account its position for a stationary object and its trajectory for a moving object. They do not pay attention to its features, nor to its possible disappearance. This means that if a stationary object changes

Evolution of object identity rules in sensori-motor infant

AGE	SPATIAL RULE		FEATURAL RULE	VISIBILITY RULE	
	Stationary object	Moving object		Visible object	Invisible object
5 months	An object remains the same if it keeps the same position	An object remains the same if it keeps the same trajectory		An object remains the same if it stays visible	
7 months	An object remains the same if it keeps the same position or changes position by moving along a trajectory In case of a conflict between spatial and featural rules, one can prevail over the other		An object remains the same if it keeps the same features	An object remains the same if it stays visible	
9 months	An object remains the same if it keeps the same position or changes position by moving along a trajectory		An object remains the same if it keeps the same features	An object remains the same if it stays visible	
12 months	An object remains the same if it keeps the same position or changes position by moving along a trajectory and if it keeps the same features			An object remains the same if it stays visible In case of a conflict between a visible and an invisible object, the visible one prevails	An object remains the same if it becomes invisible
15 months	An object remains the same if it keeps the same position or changes position by moving along a trajectory and if it keeps the same features An object remains the same whether it stays visible or becomes invisible				

its position, this simple change causes this object to loose its identity: it becomes another object. It also means that as soon as an object ceases to be visible, its identity is lost. This explains why, in task 4, when there is a substitution of two different objects, the five months old infant simply tends to reach for the substitute object, even though the features of this object are completely different from those of the target object, still visible at its side, since the substitute object now occupies the place of the target object. In the same way, the five months old infant shows no surprise, in task 5, when s/he sees a featurally different mobile reappear since the trajectory has remained the same: this second object is believed to be the same as the one which has just disappeared.

Rules such as those, obviously, have very limited applications. At five months, things still remain very unstable, endowed with a fragile, ephemeral identity. These rules must evolve if objects are to remain the same during their spatio-temporal fluctuations. And this evolution does not come about mainly by the invention of new rules, but rather by the coordination of existing rules, in other words, by their integration into some broader, more unifying, rules.

One of the first of these coordinations occurs around seven months, when the two spatial rules merge and become the "stationary-mobile" rule. At the same time, the featural rule emerges. The infant now begins to be aware of the constancy of the shape and features of objects in attributing them their identity. In task 4 (Substitution), the seven month olds no longer go to the substitute object but to their initial target object. Nevertheless, at this developmental stage, "errors" in identity subsist: many seven months babies, in task 1 (Reorien-

tation) for example, will not grasp the upside down doll towards which they were reaching. This type of "errors" will be eliminated when the spatial and the featural rules are coordinated to produce a rule which is even more complete: the "spatio-featural" rule. Then the infant will take into account both the position or trajectory of an object and its physical features to identify it.

This latter type of coordination takes time to develop, since in order for coordination to take place, there must first be conflict. The coordination of rules acts somewhat as a way out of, as a solution to such a conflict. Let us use task 5 as an example of this phenomenon. For the seven months old, the second mobile that reappears at the exit of screen II can be the same as the one that disappeared at the entrance of the screen, since the trajectory did not change: the spatial rule is respected. But this second mobile can also be a different object, since it does not have the same physical features as the first one: this violates the featural rule. So there is a possibility of conflict, and in fact, our seven months old babies (unlike our five month olds) showed signs of surprise when they saw the second mobile appear (e.g. they pointed to the object). But they nevertheless continued to track this second object. This means that despite their awareness of a potential conflict, they chose to circumvent it by adopting a behavior that conforms to their more primitive spatial rule, despite an obvious violation of their newly acquired featural rule.

At nine months, avoiding conflicts by falling back on primitive rules becomes less easy. Infants at this age face the conflict much more directly. Still using task 5 as an example, all of the nine month infants showed awareness of the problem and some gave a more mature res-

ponse: they looked for the first mobile that had disappeared, overcoming the conflict by the coordinated "spatio-featural" rule. This becomes a generalized response at twelve months: the spatio-featural rule is then consolidated. The twelve months old children, when confronted with task 5, know with certainty that there are two mobiles, one having become invisible when it stopped behind screen II. To them the second mobile is different from the first one since it violates one of their two rules, or one part of their coordinated spatio-featural rule, in this case the rule for featural identity. And there is object identity only when both rules, or parts of rule, are respected.

One could think that, at this point of development, the notion of identity has been achieved. But there exists a well-known Piagetian law of "decalage" (in this case, a vertical decalage), and even when identity of visible objects has been mastered, this does not mean that invisible objects are now "protected" from all loss of identity. One last coordination is still left to be learned. Then the infant will cease to consider the invisible object as destroyed or less real than the visible object. It is only at fifteen months that, in the trick condition of task 6, the infant is no longer fooled by the featural similarity of the two mobiles: s/he understands that if nothing has passed between the two screens, obviously this means that there are two objects and that the first one has stopped behind screen I. Unlike the younger infants, who forgot the first mobile and followed the second because it had the same features and trajectory as the first, the fifteen month infants immediately will search for the first mobile.

In conclusion, let us point to some theoretical implications of our findings. First, the notion of identity develops throughout infancy and this development is best described in terms of "rules". At this level, our results agree with the theoricians of identity, but they disagree with them on the age of acquisition of the featural rule. According to Bower, Wishart, Moore, infants acquire such a rule at about five months of age; on the contrary, our empirical findings, and this is our second conclusion, show that the acquisition of the featural rule occurs only at seven months. This finding is much more in agreement with Piaget to whom shape and size constancies are mastered only during stage IV.

Third, it is a pseudo problem to oppose identity and permanence, that is, to try to establish the anteriority of either permanence (Bower 1974; Wishart 1979) or identity (Moore 1975; Moore et al. 1978; Moore and Meltzoff 1978). Even if our conclusions are closer to Moore's, which stress that passing from the visible to the invisible world is one of the most important phenomena that the sensori-motor infant has to cope with, we do not think that identity can be said to develop before permanence. For example, let us go back to our task 6 borrowed from Moore, Borton and Darby (1978). The infants called "identity infants" by Moore and his collaborators are still making an identity mistake: without mastering permanence, infants cannot understand that there are two cars and that the car appearing at the exit of screen II, which has identical features and is on the same trajectory as the first one, is a second car and not the same as the first one.

What the sensori-motor child learns is not a series of separate attributes of objects like permanence or identity. What confronts him/her is the object as a whole. And our results show that the complete achievement of object concept is a relatively late acquisition, as Piaget always postulated. It is only gradually that, from the multiplicity of changing scenes that come and go into her/his perception, the child understands the existence of some invariants, that is, stable objects which are not continuously altered or destroyed by any slight accident.

REFERENCES

BOWER, T.G.R. (1974). Development in infancy. San Francisco: Freeman.

BOWER, T.G.R. (1975). Infant perception of the third dimension and object concept development, in L.B. Cohen, P. Salapatek (Eds.): Infant perception: from sensation to cognition, vol. II (pp. 33-51). New York: Academic Press.

BOWER, T.G.R., BROUGHTON, J.M., MOORE, M.K. (1971). Development of the object concept as manifested in changes in the tracking behavior of infants between 7 and 20 weeks of age. Journal of experimental child psychology, 11, 182-193.

BOWER, T.G.R., PATERSON, J.G. (1973). The separation of place, movement and object in the world of the infant. Journal of experimental child psychology, 15, 161-168.

COSSETTE-RICARD, M. (1980). Le développement de l'identité dans l'élaboration de la notion d'object. Thèse de doctorat inédite, Université de Montréal.

COSSETTE-RICARD, M. (1983). L'identité de l'objet chez le jeune enfant. Monography to appear in Archives de psychologie.

DECARIE, T.G. (1978). Affect development and cognition in a Piagetian context, in M. Lewis, L.A. Rosenblum (Eds.): The development of affect (pp. 183-204). New York: Plenum Press.

GIBSON, E.J. (1975). Perceptual learning and the total cognitive process, in J. Sants, H.J. Butcher (Eds.): Developmental psychology (pp. 215-233). Baltimore: Basic Books.

HAITH, M.M., CAMPOS, J.J. (1977). Human infancy. Annual review of psychology, 28, 251-294.

MOORE, M.K. (1974). The genesis of object permanence. Unpublished doctoral dissertation, Harvard University.

MOORE, M.K. (1975). Object permanence and object identity: a stage developmental model. Paper presented at the Society for Research in Child Development, Denver (Colorado).

MOORE, M.K., BORTON, R., DARBY, B. (1978). Visual tracking in young infants: evidence for object identity or object permanence? Journal of experimental child psychology, 25, 183-198.

MOORE, M.K., CLARK, D.E. (1975). Piaget's stage IV error: an identity theory interpretation. Paper presented at the Society for Research in Child Development, Denver (Colorado).

MOORE, M.K., MELTZOFF, A.N. (1978). Object permanence, imitation and language development: toward a neo-Piagetian perspective of cognitive and communicative development, in F.D. Minifie, L.L. Lloyd (Eds.): Communicative and cognitive abilities - early behavioral assessment (pp. 151-184). Baltimore: University Park Press.

MOORE, M.K., MYERS, G.D. (1975). The development of object permanence from visual tracking to total hidings: two new stages. Paper presented at the Society for Research in Child Development, Denver (Colorado).

PIAGET, J. (1968). On the development of memory and identity. Barre: Clark University Press.

PIAGET, J., VOYAT, G. (1968). Recherche sur l'identité d'un corps en développement et sur celle du mouvement transitif, in J. Piaget, H. Sinclair, V. Bang (Eds.): Epistémologie et psychologie de l'identité (pp. 1-82). Paris: Presses Universitaires de France.

VURPILLOT, E. (1976). Development of identification of objects, in H. Vernon, M.D. Vernon (Eds.): The development of cognitive processes (pp. 191-236). New York: Academic Press.

WISHART, J.G. (1979). A further investigation and evaluation of the identity hypothesis in the development of the object concept in infancy. Unpublished doctoral dissertation, University of Edinburgh.